CLAIMS

WHAT IS CLAIMED IS:

1. A network system for transferring data from a server to a client over either one of a two-way communication line and a one-way communication line, the two-way communication line transmitting data between the server and the client bidirectionally and the one-way communication line transmitting data in only one direction from the server to the client, comprising:

means for measuring data transfer rates of the two-way communication line and of the one-way communication line; and

means for selecting one from the two-way communication line and the one-way communication line on the basis of the measured data transfer rates.

2. The network system according to claim 1, wherein one communication line from the two-way communication line and the one-way communication line is presently used for data transfer, wherein the other communication line from the two-way communication line and the one-way communication line is not presently used for data transfer, and wherein the means for measuring data transfer rates comprises:

means for requesting the server to transfer required data over the other communication line not presently used for data transfer; and

means for determining total time taken to transfer required data over the communication line presently used for data transfer and for determining total time taken to transfer the required data over the communication line not presently used for data transfer.

3. The network system according to claim 2, wherein the means for determining total time taken to transfer required data over the communication line presently used for data transfer and for determining the total time taken to transfer the required data over the communication line not presently used for data

transfer comprises:

means for measuring transfer latency expressing a time lag between a sending of a request to the server for data transfer and a time the required data begins to be received by the client;

means for determining transfer time taken to transfer the required data based on the measured transfer rate and data volume of the required data; and

means for determining total time taken to transfer the required data based on the determined transfer time and the transfer latency.

4. The network system according to claim 1, wherein one communication line from the two-way communication line and the one-way communication line is presently used for data transfer, wherein the other communication line from the two-way communication line and the one-way communication line is not presently used for data transfer, and wherein the means for selecting one from the two-way communication line and the one-way communication line comprises:

means for comparing the two-way communication line with the one-way communication line in data transfer rate; and

means for switching the communication line presently used for data transfer to the communication line not presently used for data transfer when the data transfer rate of the communication line not presently used for data transfer is faster than the data transfer rate of the communication line presently used.

5. The network system according to claim 1, wherein the one-way communication line includes a satellite communication line.

6. The network system according to claim 1, wherein the data transfer rates are periodically measured at a predetermined time interval.

7. A communication device for receiving data from a server over either one of a two-way communication line and a one-way communication line, the two-way communication line transmitting data between a server and a client bidirectionally and the one-way communication line transmitting data in only one direction from the server to the client, comprising:

means for measuring data transfer rates of the two-way communication line and of the one-way communication line; and

means for selecting one from the two-way communication line and the one-way communication line on the basis of the measured data transfer rates.

8. The communication device according to claim 7, wherein one communication line from the two-way communication line and the one-way communication line is presently used for data transfer, wherein the other communication line from the two-way communication line and the one-way communication line is not presently used for data transfer, and wherein the means for measuring data transfer rates comprises:

means for requesting the server to transfer the required data over the other communication line not presently used for data transfer; and

means for measuring total time taken to transfer required data over the communication line presently used for data transfer and for determining total time taken to transfer the required data over the communication line not presently used for data transfer.

9. The communication device according to claim 8, wherein the means for measuring total time taken to transfer required data over the communication line presently used for data transfer and for determining total time taken to transfer the required data over the communication line not presently

used for data transfer comprises:

means for measuring transfer latency expressing a time lag between the sending of a request to the server for data transfer and the time the required data begins to be received by the client;

means for determining transfer time taken to transfer the required data based on the measured transfer rate and data volume of the required data; and

means for determining total time taken to transfer the required data based on the determined transfer time and the transfer latency.

10. The communication device according to claim 7, wherein one communication line from the two-way communication line and the one-way communication line is presently used for data transfer, wherein the other communication line from the two-way communication line and the one-way communication line is not presently used for data transfer, wherein the means for selecting one from the two-way communication line and the one-way communication line comprises:

means for comparing the two-way communication line with the one-way communication line in data transfer rate; and

means for switching the communication line presently used for data transfer to the communication line not presently used when the data transfer rate of the communication line not presently used for data transfer is faster than the data transfer rate of the communication line presently used.

11. The communication device according to claim 7, wherein the one-way communication line comprises a satellite communication line.

12. The communication device according to claim 7, wherein the data transfer rate is periodically measured at a predetermined time interval.

13. A communication routing method for selecting a communication route for transferring data from a server to a client over either one of a two-way communication line for transmitting data between the server and the client bidirectionally and a one-way communication line for transmitting data in only one direction from the server to the client, comprising the steps of:

measuring data transfer rates of the two-way communication line and the one-way communication line; and

selecting one from the two-way communication line and the one-way communication line on the basis of the measured data transfer rates.

14. The communication routing method according to claim 13, wherein one communication line from the two-way communication line and the one-way communication line is presently used for data transfer, wherein the other communication line from the two-way communication line and the one-way communication line is not presently used for data transfer, and wherein the step of measuring data transfer rates comprises:

requesting the server to transfer the required data over the other communication line not presently used for data transfer; and

determining total time taken to transfer required data over the communication line presently used for data transfer and determining total time taken to transfer the required data over the communication line not presently used for data transfer.

15. The communication routing method according to claim 14, wherein the step of determining total time taken to transfer required data over the communication line presently used for data transfer and determining total time taken to transfer the required data over the other communication line, comprises performing the following steps for each of the communication line presently used for data transfer and communication line not presently used for data transfer:

measuring transfer latency expressing a time lag between a

sending of a request to the server for data transfer and a time the required data begins to be received by the client;

measuring the transfer rate of the required data;

determining transfer time taken to transfer the required data based on the measured transfer rate and data volume of the required data; and

determining total time taken to transfer the required data based on the determined transfer time and the transfer latency.

16. The communication routing method according to claim 13, wherein one communication line from the two-way communication line and the one-way communication line is presently used for data transfer, wherein the other communication line from the two-way communication line and the one-way communication line is not presently used for data transfer, and wherein the step of selecting one from the two-way communication line and the one-way communication line comprises:

comparing the two-way communication line with the one-way communication line in data transfer rate; and

switching the communication line used for data transfer to the communication line not presently used when the data transfer rate of the communication line not presently used is faster than the data transfer rate of the communication line presently used.

17. The communication routing method according to claim 16, wherein the step of switching to the communication line not presently used comprises:

requesting the server to transfer data over the faster communication line not presently used, in parallel with the data transfer over the slower communication line presently used; and

canceling data transfer over the slower communication line at the point that total data transfer volume over the faster communication line catches

up with total data transfer volume over the slower communication line.

18. The communication routing method according to claim 13, wherein the data transfer rates are measured periodically at a predetermined time interval.